VOL. 04 NO. 02 February/March 1998

USACHPPM

MSMR

Medical Surveillance Monthly Report

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Army Medical Surveillance Activity (AMSA)

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Data in the MSMR is provisional, based on reports and other sources of data available to the Medical Surveillance Activity. Notifiable conditions are reported by date of onset (or date of notification when date of onset is absent). Only cases submitted as confirmed are included.

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
MAR 1998		**00-02-1998 to 00-03-1998**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Medical Surveillance Monthly Report (MSMR). Volume 4, Number 2, February/March 1998	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **U.S. Army Center for Health Promotion and Preventive Medicine,Armed Forces Health Surveillance Center (AFHSC),2900 Linden Lane, Suite 200,Silver Spring,MD,20910**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**16**	

Surveillance Trends

Hospitalizations of Active Duty Soldiers for Back Disorders: Part 1, Pain of Unspecified Etiology

Numerous studies over many years[1-3] have documented the medical (e.g., hospitalizations, medical disability discharges) and military operational (e.g., disruption of training) impacts of back pain among soldiers. For this report, the Army Medical Surveillance Activity (AMSA) reviewed the recent hospitalization experience of active duty soldiers with regards to thoracic or lumbar back pain of unspecified etiology. For calendar years 1990 through 1997, records of hospitalizations of active duty soldiers were searched to identify those with principal discharge diagnoses of "lumbago" (International Classification of Diseases, 9th revision, code: 724.2), "pain in thoracic spine" (ICD-9 code: 724.1) or "backache, unspecified" (ICD-9 code: 724.5). To determine if certain military occupational specialties (MOS) were over- or under-represented among back pain cases, for each MOS series, we calculated an expected number of cases by multiplying the proportional representation of each MOS series in the Army overall by the total number of back pain cases. Variations between the observed and expected number of cases were then calculated for each MOS series, and the statistical significance of variations was assessed based on the chi-square distribution (nominal statistical significance defined as $p < .05$).

Overall: From 1990 to 1997, there were 3,404 hospitalizations of 2,964 soldiers for thoracic or lumbar pain of unspecified etiologies. More than 10% of soldiers hospitalized with back pain (n=312) were medically retired or separated (most with a severance payment) from active service. The crude incidence rate was 7.8 per 10,000 soldiers per year. During the period, hospitalization rates consistently declined (figure 1). In fact, the Armywide rate for calendar year 1990 (13.1 per 10,000 soldier-yrs) was more than 3-fold higher than for 1996 (4.1 per 10,000 soldier-yrs).

In general, back pain hospitalizations were more frequent in winter and spring months than in summer and fall. For example, there were approximately 50% more back pain-related hospitalizations during January, March, and April (n=941) than during June, July, and August (n=636).

Between 1991 and 1996, there were 95,168 lost duty days associated with back pain hospitalizations. The mean days lost per hospitalization was 42; the median was 6. Approximately 15% (n=353) of hospitalizations resulted in a single lost duty day while approximately 20% (n=484) resulted in a month or more of lost time.

Demographic: Back pain-associated hospitalization rates increased with age. With control of effects of age, back pain hospitalization rates were higher among females than males (figure 2) and among lower ranking soldiers compared to higher (figure 3).

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Executive Editor
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Editor
LTC Mark V. Rubertone, MD, MPH

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Kimmie Kohlhase, MS

Writer / Editor
MAJ Lisa Pearse, MD, MPH

Prepared by the Medical Surveillance Activity, Directorate of Epidemiology and Disease Surveillance, United States Army Center for Health Promotion and Preventive Medicine.
Inquiries regarding content or material to be considered for publication should be directed to the editor, Army Medical Surveillance Activity, Bldg. T-20, Rm 213, Washington DC, 20307-5100. E-mail: "ltc_mark_rubertone@wrsmtp-ccmail.army.mil"
Publishing office is the Executive Communications Division, United States Army Center for Health Promotion and Preventive Medicine, Aberdeen Proving Ground, Maryland 21010-5422.
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Figure 1. Hospitalizations for back pain, unspecified etiologies, active duty soldiers, by year and age

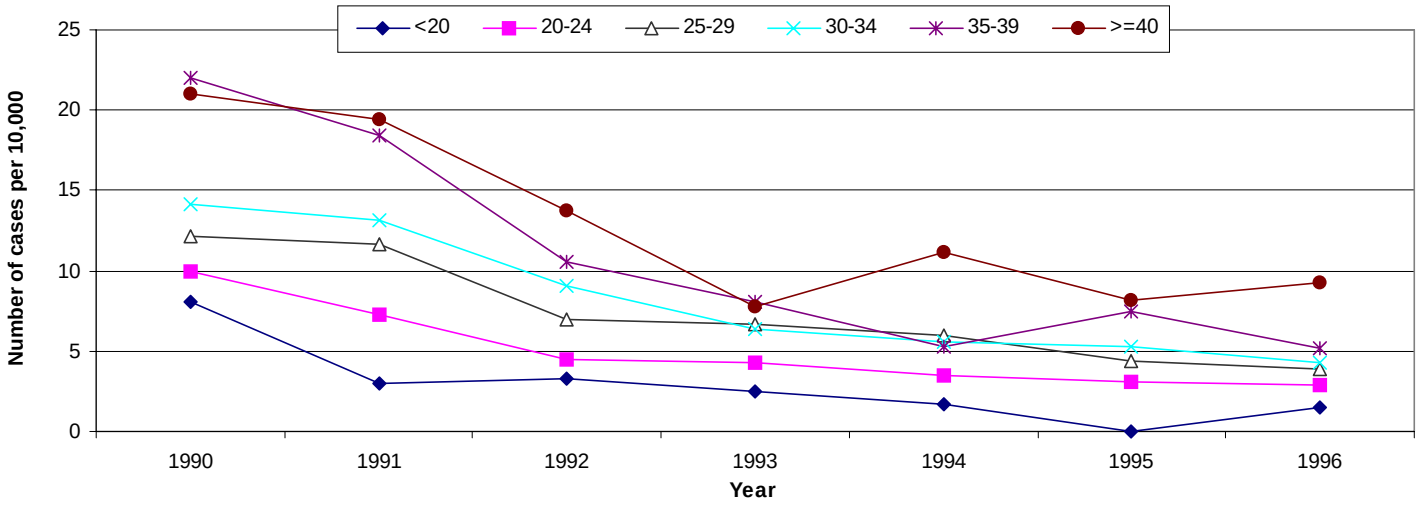


Figure 2. Hospitalizations for back pain, unspecified etiologies, active duty soldiers, by gender and age

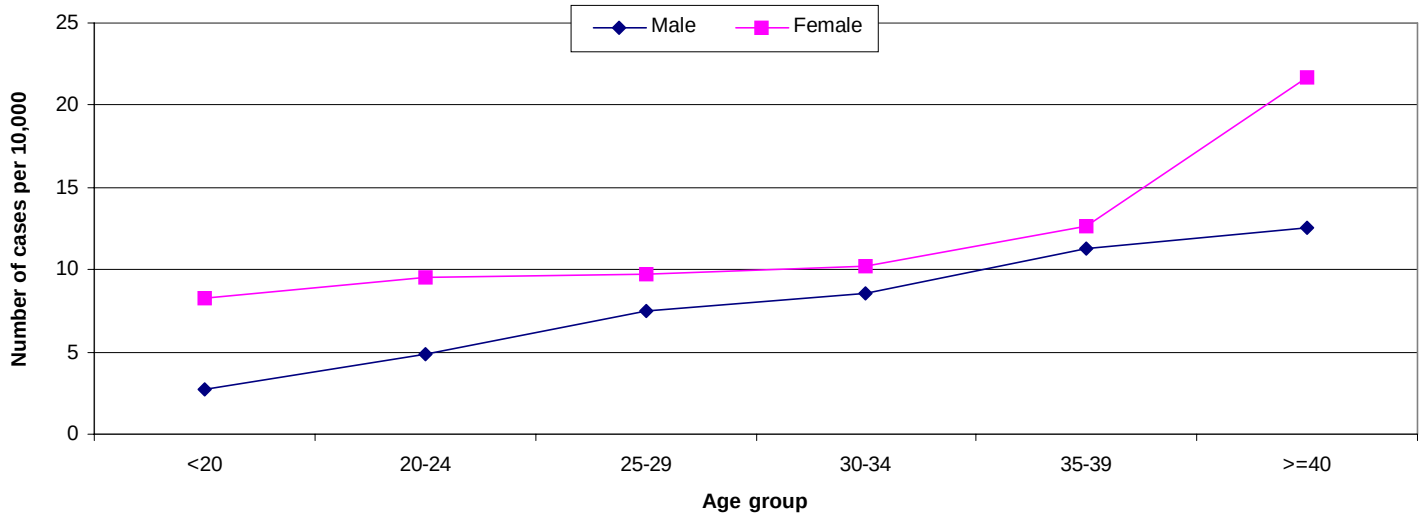


Figure 3. Hospitalizations for back pain, unspecified etiologies, active duty soldiers, by age and grade

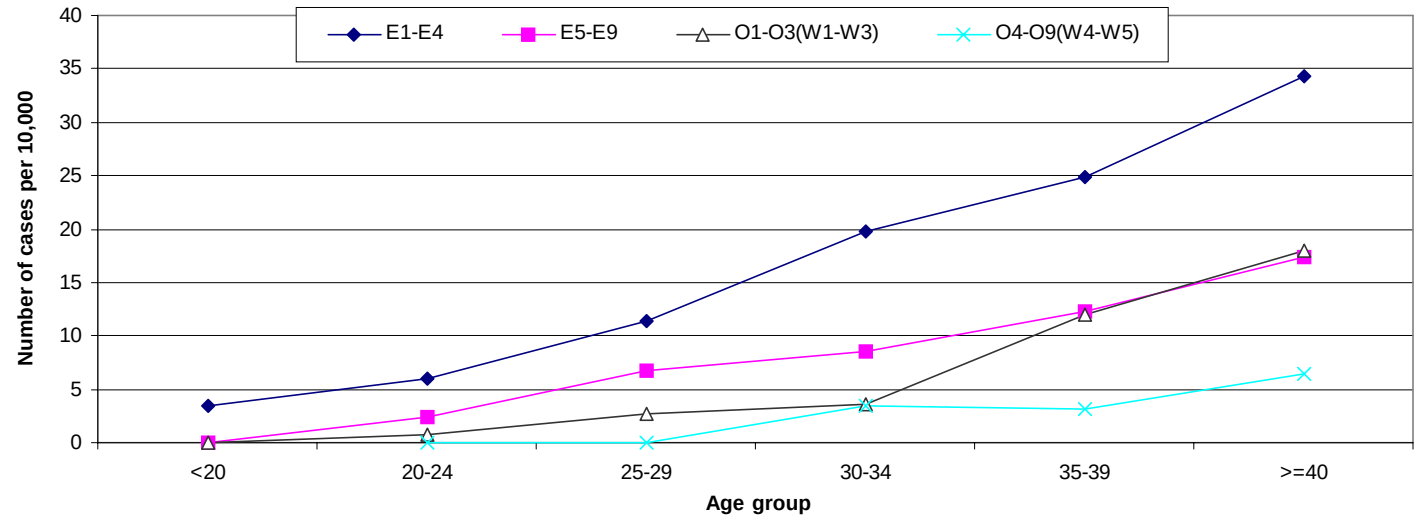


TABLE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
January, 1998

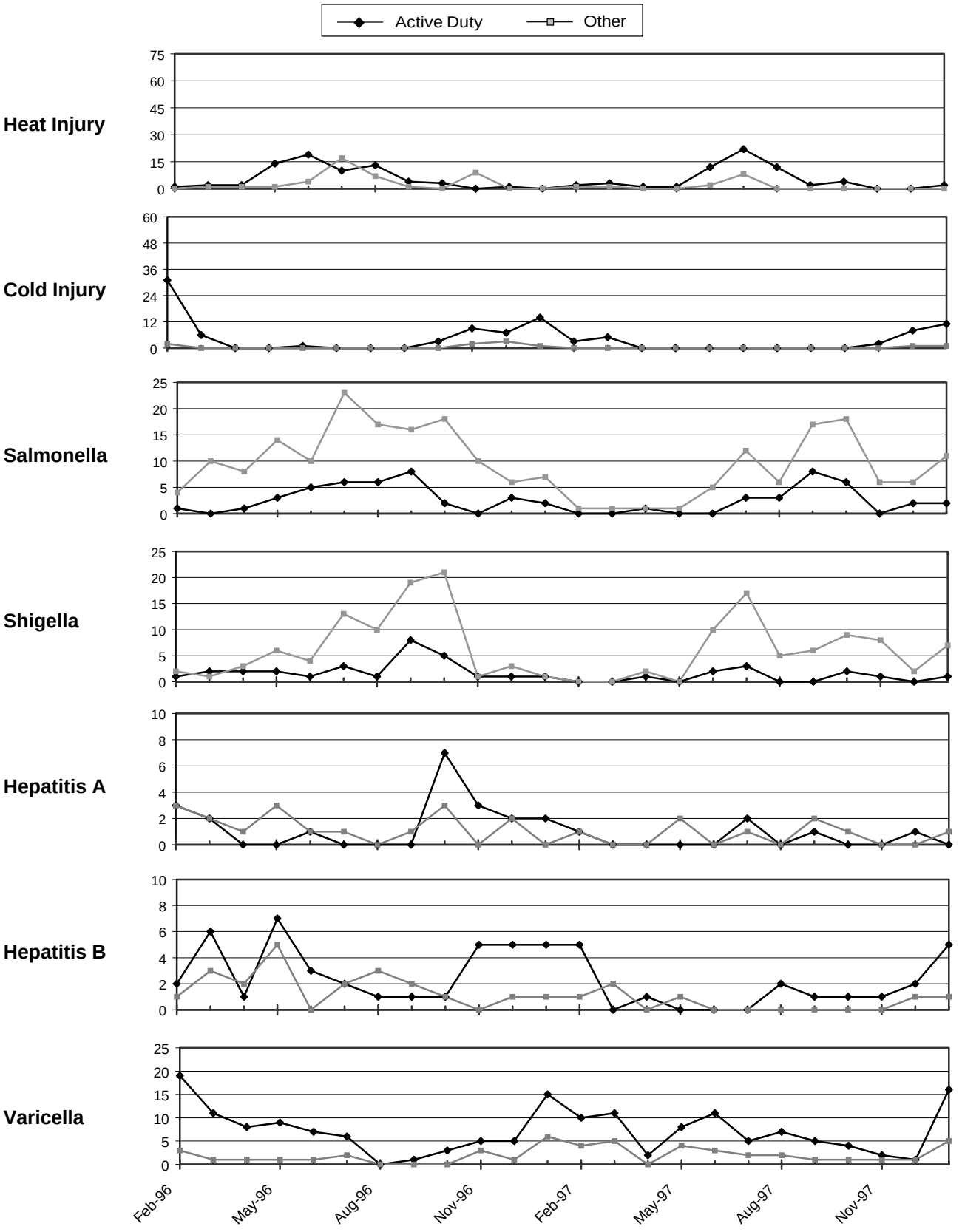
Reporting MTF/Post**	Total number of reports submitted January 1998	Environmental Injuries		Viral Hepatitis		Salmonellosis		Shigella		Varicella	
		Active Duty				Active Duty	Other	Active Duty	Other	Active Duty	Other Adult
		Heat	Cold	A	B						
		Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998	Cum. 1998
NORTH ATLANTIC RMC											
Walter Reed AMC	25	0	0	0	0	0	1	0	0	2	0
Aberdeen Prov. Ground, MD	0	0	0	0	0	0	0	0	0	0	0
FT Belvoir, VA	38	0	0	0	0	0	3	0	0	0	0
FT Bragg, NC	9	0	0	0	0	0	1	0	6	0	0
FT Drum, NY	4	0	1	0	0	0	0	0	0	0	0
FT Eustis, VA	13	0	0	0	0	0	1	1	0	1	0
FT Knox, KY	24	0	0	0	0	0	0	0	0	3	0
FT Lee, VA	10	0	0	0	0	0	0	0	0	0	0
FT Meade, MD	1	0	0	0	0	0	0	0	0	0	0
West Point, NY	1	0	0	0	1	0	0	0	0	0	1
GREAT PLAINS RMC											
Brooke AMC	18	0	0	0	1	0	0	0	0	1	0
Beaumont AMC	17	0	0	0	0	0	0	0	0	4	0
FT Carson, CO	51	0	0	0	0	1	1	0	0	1	0
FT Hood, TX	96	0	0	0	3	0	0	0	0	0	0
FT Huachuca, AZ	0	0	0	0	0	0	0	0	0	0	0
FT Leavenworth, KS	2	0	0	0	0	0	0	0	0	0	0
FT Leonard Wood, MO	15	0	1	0	0	0	0	0	0	0	3
FT Polk, LA	22	0	0	0	0	0	0	0	0	0	0
FT Riley, KS	21	0	0	0	0	0	0	0	0	0	0
FT Sill, OK	27	0	0	0	0	0	0	0	0	0	0
SOUTHEAST RMC											
Eisenhower AMC	0	0	0	0	0	0	0	0	0	0	0
FT Benning, GA	12	2	1	0	0	0	1	0	0	1	0
FT Campbell, KY	68	0	0	0	0	0	0	0	1	0	0
FT Jackson, SC	0	0	0	0	0	0	0	0	0	0	0
FT McClellan, AL	0	0	0	0	0	0	0	0	0	0	0
FT Rucker, AL	0	0	0	0	0	0	0	0	0	0	0
FT Stewart, GA	21	0	0	0	0	0	0	0	0	1	0
WESTERN RMC											
Madigan AMC	48	0	0	0	0	0	0	0	0	1	0
FT Irwin, CA	2	0	0	0	0	0	0	0	0	0	0
FT Wainwright, AK	7	0	7	0	0	0	0	0	0	0	0
OTHER LOCATIONS											
Tripler	24	0	0	0	0	0	0	0	0	0	0
Europe	23	0	1	1	1	1	3	0	0	1	1
Korea	0	0	0	0	0	0	0	0	0	0	0
Total	**599**	**2**	**11**	**1**	**6**	**2**	**11**	**1**	**7**	**16**	**5**

* Based on date of onset.

** Reports are included from main and satellite clinics. Not all sites reporting.

Date of Report: 7-Feb-98

FIGURE I. Selected sentinel reportable diseases, US Army medical treatment facilities*
Cases per month, Feb 96 - Jan 98



* Reports are included from main and satellite clinics. Not all sites reporting.

Date of report: 7-Feb-98

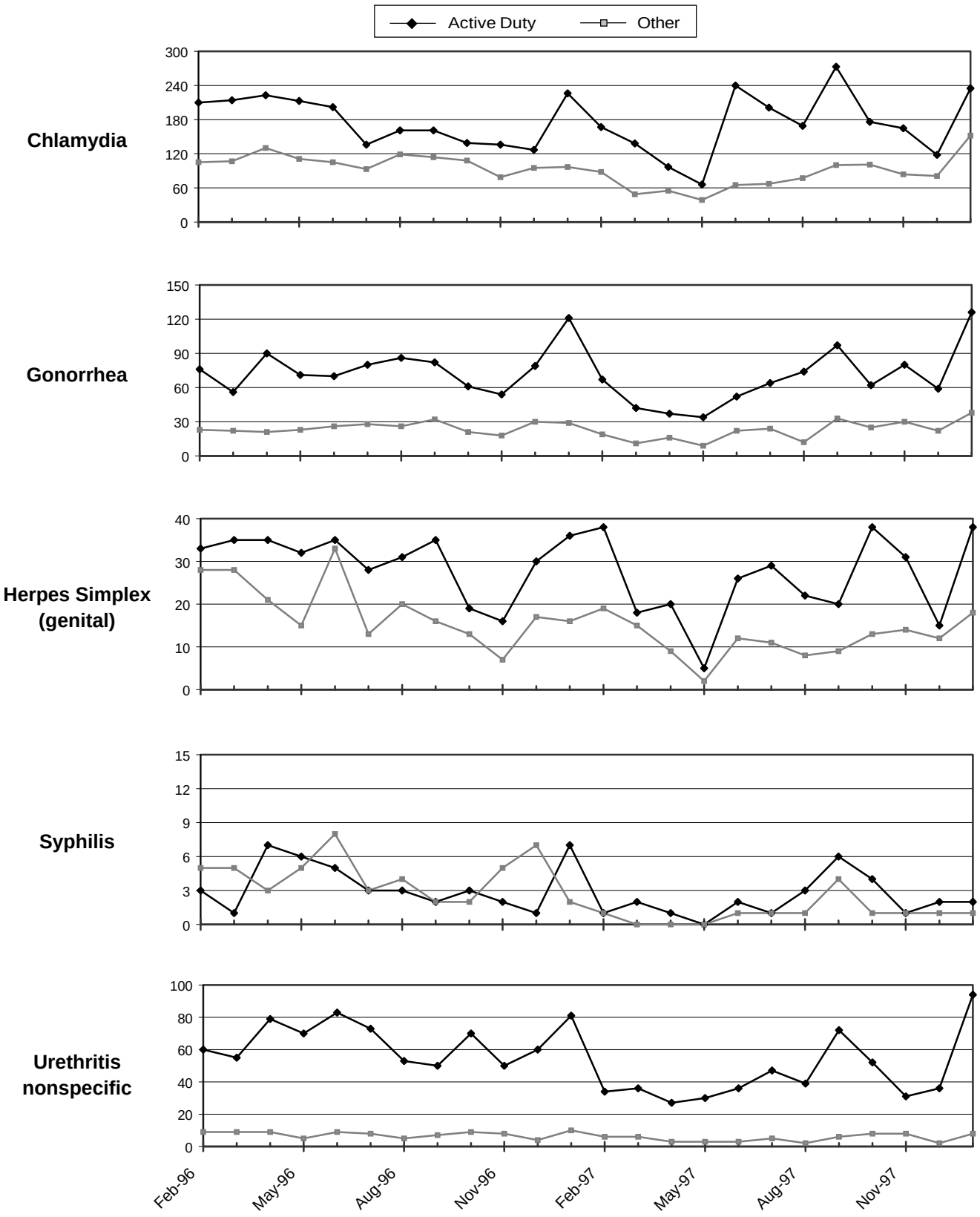
TABLE II. Reportable sexually transmitted diseases, US Army medical treatment facilities* January, 1998

Reporting MTF/Post**	Chlamydia		Urethritis non-spec.		Gonorrhea		Herpes Simplex		Syphilis Prim/Sec		Syphilis Latent		Other STDs**	
	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998	Cur. Month	Cum. 1998
NORTH ATLANTIC RMC														
Walter Reed AMC	3	3	0	0	1	1	3	3	0	0	0	0	0	0
Aberdeen Prov. Ground, MD	0	0	0	0	0	0	1	1	0	0	0	0	0	0
FT Belvoir, VA	23	23	0	0	5	5	7	7	0	0	0	0	1	1
FT Bragg, NC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Drum, NY	2	2	0	0	1	1	1	1	0	0	0	0	0	0
FT Eustis, VA	8	8	0	0	2	2	0	0	0	0	0	0	0	0
FT Knox, KY	8	8	0	0	5	5	5	5	0	0	0	0	0	0
FT Lee, VA	5	5	0	0	5	5	0	0	0	0	0	0	0	0
FT Meade, MD	0	0	0	0	0	0	1	1	0	0	0	0	0	0
West Point, NY	1	1	0	0	1	1	1	1	0	0	0	0	0	0
GREAT PLAINS RMC														
Brooke AMC	24	24	0	0	5	5	1	1	0	0	0	0	0	0
Beaumont AMC	16	16	0	0	7	7	1	1	0	0	0	0	0	0
FT Carson, CO	33	33	18	18	5	5	4	4	0	0	0	0	0	0
FT Hood, TX	63	63	19	19	40	40	5	5	0	0	0	0	1	1
FT Huachuca, AZ	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Leavenworth, KS	1	1	0	0	0	0	0	0	0	0	0	0	0	0
FT Leonard Wood, MO	5	5	4	4	1	1	0	0	0	0	0	0	0	0
FT Polk, LA	15	15	0	0	7	7	0	0	0	0	0	0	0	0
FT Riley, KS	18	18	0	0	5	5	0	0	0	0	0	0	0	0
FT Sill, OK	11	11	6	6	17	17	1	1	0	0	0	0	0	0
SOUTHEAST RMC														
Eisenhower AMC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Benning, GA	17	17	0	0	12	12	2	2	0	0	0	0	0	0
FT Campbell, KY	46	46	0	0	21	21	2	2	0	0	0	0	0	0
FT Jackson, SC	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT McClellan, AL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FT Rucker, AL	4	4	0	0	1	1	0	0	0	0	0	0	0	0
FT Stewart, GA	19	19	33	33	11	11	8	8	0	0	0	0	0	0
WESTERN RMC														
Madigan AMC	34	34	22	22	3	3	3	3	0	0	0	0	0	0
FT Irwin, CA	2	2	0	0	0	0	0	0	0	0	0	0	0	0
FT Wainwright, AK	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER LOCATIONS														
Tripler	13	13	0	0	4	4	9	9	0	0	0	0	0	0
Europe	16	16	0	0	5	5	1	1	1	1	0	0	0	0
Korea	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**387**	**387**	**102**	**102**	**164**	**164**	**56**	**56**	**1**	**1**	**0**	**0**	**2**	**2**

* Reports are included from main and satellite clinics. Not all sites reporting. Date of Report: 7-Feb-98

** Other STDs: (a) Chancroid (b) Granuloma Inguinale (c) Lymphogranuloma Venereum (d) Syphilis unspec. (e) Syph, tertiary (f) Syph, congenital

FIGURE II. Reportable sexually transmitted diseases, US Army medical treatment facilities*
Cases per month, Feb 96 - Jan 98



* Reports are included from main and satellite clinics. Not all sites reporting.

Date of report: 7-Feb-98

Continued from page 2

Military occupational series (MOS): There were more back pain-associated hospitalizations among infantrymen (11 series) than any other MOS category. However, in relation to their representation in the Army, there were not excess cases among infantry soldiers.

Among enlisted soldiers (table), there were seven MOS series with significant excesses of cases (including supply, transportation, food service, parachute rigger, air defense) and six series with significant deficits (including laboratory technician, field artillery, aviation operations, band, armor/cavalry). Among officers, nurses and chaplains had significant excesses of back pain-related hospitalizations.

Editorial comment: This summary of back pain hospitalizations of unspecified etiology reflects only the tip of the iceberg of the military and medical consequences of back disorders. For example, only hospitalized cases were included, and those specifically related to intervertebral disc disorders or pain or dysfunction of spinal nerves (e.g., sciatica) were not. While hospitalization rates have declined significantly over the past few years, this summary documents the continuing military operational and medical importance of back-related morbidity.

References:
1. Bollet, AJ. Rheumatic diseases among civil war troops. Arthritis Rheum, 1991, 34:9(September), 1197-1203.
2. Anderson, ST, Charlesworth, RW. Rheumatologic disease among Air Force recruits: a multi-million dollar epidemic. Semin Arthritis Rheum, 1993, 22:4(February), 275-9.
3. Rohrer, MH, Sanros-Eggiman, B, Paccaud, F, Haller-Maslov, E. Epidemiologic study of low back pain in 1398 Swiss conscripts between 1985 and 1992. Eur Spine J, 1994, 3:1, 2-7.

Military occupational series' (MOS) with signifcant excess/deficit of back pain hospitalizations

Occupations with significant excesses of back pain hospitalizations

MOS Series	Description	Observed (obs) cases	Expected (exp) cases	Excess cases (obs - exp)	SMR (obs/exp)	P value
E 76	(Supply and services)	159	92.2	66.8	1.7	.001
O 66	(Nurse corps)	29	12.1	16.9	2.4	.001
E 77	(Petroleum and water)	78	45.8	32.2	1.7	.001
E 88	(Transportation)	135	94.5	40.5	1.4	.001
E 94	(Food service)	78	55.9	22.1	1.4	.01
O 56	(Chaplain)	9	3.8	5.2	2.4	.01
E 43	(Parachute rigger)	15	7.9	7.1	1.9	.05
E 66	(Mechanical / technical inspection)	3	0.8	2.2	3.7	.05
E 16	(Air defense artillery)	50	37.1	12.9	1.3	.05

Occupations with significant deficits of back pain hospitalizations

MOS Series	Description	Observed (obs) cases	Expected (exp) cases	Excess cases (obs - exp)	SMR (obs/exp)	P value
E 92	(Laboratory technician)	63	113.7	-50.7	0.6	.001
E 13	(Field artillery)	133	170.4	-37.4	0.8	.01
E 93	(Aviation operations)	11	22.7	-11.7	0.5	.05
E 2	(Band)	4	12.3	-8.3	0.3	.05
E 35	(Electronic maintenance and calibration)	7	16.3	-9.3	0.4	.05
E 19	(Armor)	102	126.2	-24.2	0.8	.05

Case Report

Leprosy (Hansen's Disease) in an Active Duty Soldier

In November 1996, while serving in Kuwait, a 32-year-old active duty soldier noted an erythematous, nonpruritic, annular rash on his left thigh and knee. Over the next several months, the rash slowly spread to the back of his thigh and down his leg. Concurrently, the soldier noted pain in his left knee, intermittent paresthesias of his left ankle, and decreased tactile sensation and perspiration in areas of skin affected by the rash.

Other skin lesions had recently been noted on a forearm, shoulder, ear, cheek, and his right leg. He denied symptoms of fever, sweats, chills, nausea, vomiting, diarrhea, cough, weakness, and visual or auditory changes. He received a presumptive diagnosis of leprosy and was admitted to an Army medical center for further evaluation and treatment.

The soldier was born and raised in Samoa. He served in Kuwait for approximately three months in 1996 and was assigned to Korea at the time of admission. He was unaware of any close personal contacts with family members or others with leprosy.

A physical examination revealed a well-developed and healthy appearing soldier in no distress. There were no remarkable physical findings other than those associated with his skin. Most notably, an area of skin with a raised, erythematous border and a slightly hypopigmented center covered a significant portion of his left thigh, his knee, and the back of his leg to his ankle. Decreased sensation to light touch, pinprick, and temperature were noted in the affected area. In addition, there were small papules noted on an ear, a shoulder, a forearm, and his right thigh and leg. There were no palpable peripheral nerves.

Biopsies of affected skin were consistent with a diagnosis of active tuberculoid leprosy. The soldier was begun on therapy with dapsone and rifampin, and he was discharged to outpatient treatment with routine, periodic follow-ups.

Information provided by Ed Tanaguchi, Preventive Medicine Activity, Tripler Army Medical Center, Honolulu, Hawaii.

Editorial comment: Leprosy is a chronic disease, caused by *Mycobacterium leprae,* that affects the skin and peripheral nerves of human hosts. Individuals with untreated infections shed *M. leprae* in high concentrations in their nasal secretions; however, transmission from infected to uninfected persons generally requires prolonged and close personal (e.g., household) contact.[1] Thus, leprosy is not considered a significant threat to military operations, even in regions with high infection prevalences.

Leprosy is distributed worldwide; in 1997, there were an estimated 1.15 million cases. It is most prevalent in countries of south and southeast Asia, the Indian subcontinent, the western Pacific, sub-Saharan Africa, and Central and South America. Individuals infected with *M. leprae* quickly become noninfectious after initiating multiple drug therapy (MDT). Thus, aggressive case finding linked to MDT are keys to the World Health Organization's strategic plan to eliminate leprosy as a public health problem (prevalence < 1 per 10,000 population) by the year 2000.[2]

References:
1. Benenson, AS (editor). Control of communicable diseases manual (16th edition), 1995, 264-7.
2. Progress towards leprosy elimination. WHO Weekly Epi Record, 1997, 72, 165

Outbreak Report

Influenza among Immunized Members of an Aviation Squadron, US Navy, Hawaii

In January 1998, a Navy flight surgeon noted an increase in influenza-like illnesses among members of an aviation squadron that had received influenza vaccine the preceding November (figure, page 12). An epidemiologic investigation was conducted. A questionnaire was developed by epidemiologists at the Navy Environmental and Preventive Medicine Unit (NEPMU) No. 6, and throat viral isolation kits were provided to the clinic, which serves three other aviation squadrons in addition to the "outbreak squadron." For investigation purposes, a case of influenza-like illness (ILI) was defined as self-reported fever and cough and/or positive influenza virus isolate.

The questionnaire was completed by 254 of 362 (70%) assigned members of the outbreak squadron. Of the respondents, 83 (33%) reported a "flu-like" illness during the month of January — nearly two-thirds (n=54) of the reported "flu-like" illnesses met the ILI case definition. Symptoms reported by ILI cases, in order of prevalence, were: fever and cough (100%), congestion (87%), fatigue (81%), headache (81%), myalgias (74%), nausea (33%), diarrhea (28%) and vomiting (7%). The mean age of ILI cases (28.2 years) did not significantly vary from that of noncases (29.0 years). Attack rates of ILI did not statistically significantly vary in relation to gender or recent travel outside of Hawaii (table, page 12).

Immunization logs and patient records were also reviewed. More than three-fourths (n=197, 78%) of the 254 questionnaire respondents were documented recipients in November 1997 of the 1997-98 influenza vaccine. Forty (20%) of 197 squadron members with documented immunizations and 13 (24%) of 54 without such documentation reported a January episode of an illness consistent with the ILI case definition. Thus, attack rates of ILI did not statistically significantly vary in relation to documented immunization status. During January 1998 in the affected squadron, the estimated efficacy of the influenza vaccine for preventing influenza-like illness was 16.7%.

To assess the possibility of disease course modifications associated with vaccination (i.e., cross protection), the severity and duration of illnesses among vaccinated and unvaccinated cases were compared. Symptoms lasted an average of 6.4 days among immunized and 6.6 days among unimmunized ILI cases.

Finally, the Navy clinic that detected the outbreak serves as a sentinel site of Project Gargle, an Air Force Surgeon General directed respiratory disease surveillance program.[1, 2] Project Gargle routinely collects clinical specimens from sites worldwide to detect and characterize circulating strains of influenza and other respiratory viral pathogens. The virus laboratory that supports Project Gargle is at Brooks AFB, San Antonio, Texas. During the month of January, influenza A was recovered from 25 (57%) of 44 throat swab specimens submitted to Project Gargle from two Navy medical clinics, including the outbreak clinic. Of the 25 isolates, 21 were from active duty members (of whom four were survey participants assigned to the outbreak squadron), and 4 were from family members. The Influenza Branch, Centers for Disease Control and Prevention (CDC), characterized one of the outbreak-related influenza strains as subtype A/Sydney(H3N2).

Reported by CAPT James Beecham, MC, USN, and CDR A.J. Yund, MC, USN, NEPMU-6, Pearl Harbor, Hawaii.

Editorial comment: This outbreak in immunized members of a Navy aviation squadron highlights several points regarding the military medical significance of influenza. First, in populations with high prevalences of immunologic susceptibility, influenza can produce high attack rates of disabling illnesses with alarming rapidity. In turn, high attack rates of influenza in military populations can cripple,

ARD Surveillance Update

Legend

ARD Rate = (ARD cases / Trainees) * 100

SASI* = ARD Rate * Strep Rate**

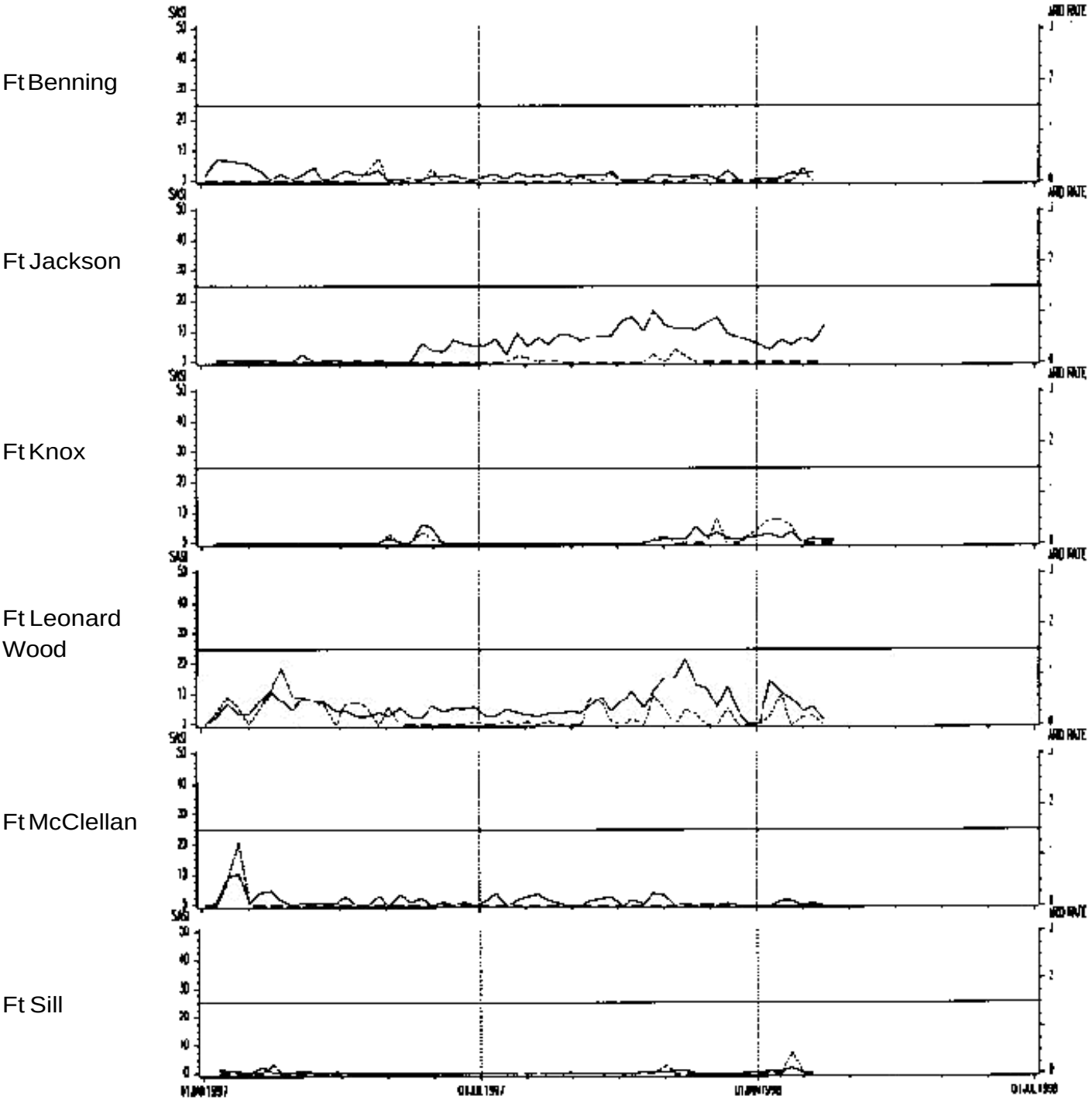


Figure III. ARD surveillance rates, submitted by Army TRADOC posts

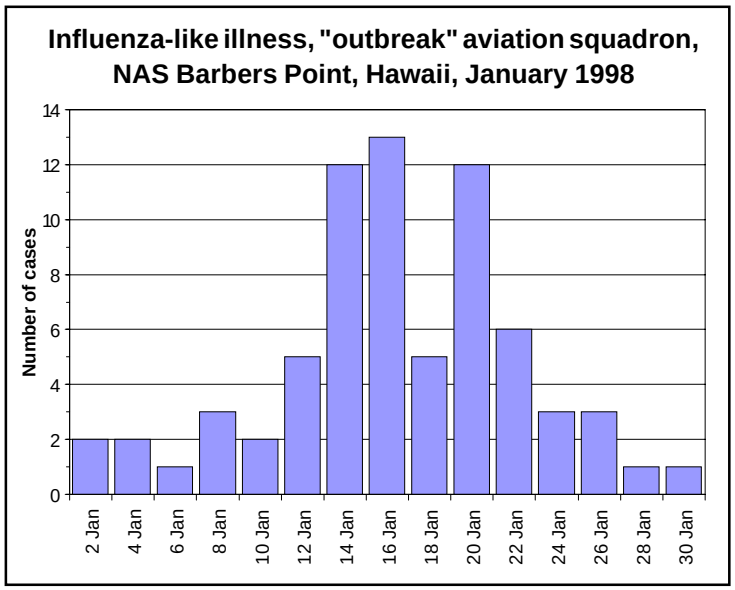
* Strep/ARD Surveillance Index (SASI)

**Strep Rate= (GABHS(+) / Cultures) *100

Note: SASI has proven to be a reliable predictor of serious strep-related morbidity, especially acute rheumatic fever.

Immunization status, gender, and travel

	# with influenza-like illness / # in subgroup	Attack rate
Immunization status (per documentation)		
Immunized	40/197	20%
Not immunized	13/54	24%
Gender		
Female	12/61	20%
Male	42/193	22%
Travel (recent) outside Hawaii		
Yes	11/54	20%
No	38/199	19%



at least temporarily, unit readiness and military operational effectiveness. Second, the requirement that all military members receive annual influenza immunizations is a critical unit readiness issue. The non-medical chain of command should enforce compliance with this requirement. Third, the efficacy of each year's vaccine against circulating strains depends directly on the completeness, quality, and timeliness of global collaborative influenza surveillance efforts. For more than two decades, the US Air Force's Project Gargle has played a key role in global efforts to identify and characterize variant influenza strains – and thus to determine the best antigenic mix of the constantly changing vaccine. Fourth, immunization with the current year's vaccine does not guarantee immunologic protection against circulating influenza strains. Influenza vaccines are estimated to be 70-90% effective among healthy young adults against viruses homologous to the vaccine strains. This year's vaccine was formulated using A/Wuhan (H3N2), A/Bayern(H1N1), and B/Harbin-like strains. The A/Sydney(H3N2) subtype that was implicated in this outbreak is antigenically similar to but distinguishable from A/Wuhan. Thus, antibodies induced by the current vaccine were considered at least partially protective against A/Sydney-like viruses.[3] Such an effect was not apparent during the Navy outbreak.

When outbreaks of influenza-like illnesses occur in presumably immunized groups (e.g., military units), they should be expeditiously investigated. As the NEPMU-6 staff did in this outbreak, investigators should attempt to verify immunization statuses of affected and unaffected population members, isolate and characterize epidemic-associated strains of responsible agent(s), and assess the preventive efficacy and other potential effects (e.g., clinical severity, symptoms' duration) of the vaccine. Such information is essential for updating medical threat assessments, assessing potential military operational impacts, and planning appropriate countermeasures (e.g., amantadine, antigenic components of new vaccines). In this case, the Project Gargle laboratory at Brooks AFB, Texas, provided the Navy investigators with the expert, dedicated laboratory support that was required for the investigation.

References:
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Case Reports

Transfusion-transmitted *P. falciparum* Malaria

Case #1

A trainee at a large Army basic training post volunteered to donate during a post blood drive. His donated blood was later transfused to an elderly patient with gastrointestinal bleeding. Three weeks following the transfusion, the patient was hospitalized with recurrent bleeding and fever to 104° F. Peripheral blood smears showed intraerythrocytic rings, trophozoites, and gametocytes consistent with *Plasmodium falciparum* malaria. The level of parasitemia was not determined. Treatment was begun with quinine and doxycycline. A sample of serum from the donated unit was retrieved and sent to the Centers for Disease Control and Prevention (CDC) for laboratory analyses. Indirect immunoflourescence assays (IFA) detected antibodies to *P. falciparum* (titer > 1:16,000), *P. malariae* (titer: 1:4,096), *P. ovale* (titer: 1:1,024), and *P. vivax* (titer: 1:64, with >1:64 considered positive).

The military donor was born and raised in a small west African country. In 1995, at age 17, he emigrated with his parents to the United States. He denied travel to other countries before or following his entry to the US. Other than the usual childhood illnesses, his medical history was remarkable only for a severe febrile illness at approximately age 11. He believes he was told at the time that the illness was malaria. He recalled that he was treated as an outpatient – but he did not recall the medication or the duration of treatment. He denied recurrences of high fevers or shaking chills. The trainee denied blood donations prior to his military service.

Physical examination of the donor revealed a well developed and healthy appearing 19-year-old black male with no medical complaints. He was cooperative and intelligent, and he spoke and understood English well. There were no remarkable physical findings — specifically, there was no lymphadenopathy, jaundice, abdominal tenderness or hepatosplenomegaly. Routine laboratory analyses were unremarkable except WBCs were mildly elevated (10,100/ml), and there were 9% eosinophils. Malaria thick and thin smears were negative.

Blood samples were sent to the CDC to assess the soldier's current malaria status. No parasites were seen on smears, but a polymerase chain reaction (PCR) test was positive for *P. falciparum*. Serologic assays (by IFA) again documented a significantly elevated titer to *P. falciparum (*1:16,384). Titers to the three other plasmodium species were elevated to a lesser degree.

The trainee was informed that high levels of anti-malaria antibodies were detected in his blood. He was treated with quinine and doxycycline for presumptive chloroquine-resistant falciparum malaria and returned to full duty.

Report submitted by Richard L Wygant Jr., PA-C, Staff Physician Assistant and LTC David Niebhur, Chief Preventive Medicine, USAMEDDAC, Ft Knox, KY

Case #2

A 70-year-old patient with a serious blood dyscrasia presented in late November 1996 with fever. Peripheral blood smears demonstrated intraerythrocytic *Plasmodium* parasites — the species was not determined at the time. Over the next few days, the patient's condition deteriorated despite treatment with quinine and clindamycin.

As part of his treatment over the previous six months, the patient had received seven units of packed red blood cells (two in May, two in June, and three approximately two weeks prior to his November admission). The CDC reviewed the patient's smears and found *Plasmodium falciparum*, with a parasitemia of 6.1%. Assays (by IFA) of stored sera of the patient's seven donors revealed one with significant concentrations of antibodies against *P. falciparum* (titer: 1:16,384).

The donor with serologic evidence of *P. falciparum* was an Army Reservist who was based at the same military post as case #1. In addition, the donated blood had been collected by the same civilian donor center as case #1. Smears of the donor's blood showed rare ring forms of *P. falciparum*, and serologic assays were consistent with those on the stored sample. The donor had emigrated to the United States from west Africa in April 1996. He denied histories of malaria or symptoms consistent with malarial infection. Treatment of the donor with quinine and doxycycline was recommended.

Editorial comment: In the United States, malaria is a rare complication of blood transfusion – the incidence is estimated to be 0.25 cases/million units collected (an average of only approximately three cases in the United States per year).[1] Currently, the avoidance of malaria transmission from transfusions relies upon donor questioning. The American Association of Blood Banks (AABB)[2] and the Food and Drug Administration (FDA)[3] have issued the following guidelines to prevent transfusion-transmitted malaria:

1. Permanent residents of non-endemic countries who travel to an area considered to be endemic for malaria by the Malaria Branch, Centers for Disease Control and Prevention, must not be accepted as donors of whole blood or blood components prior to one year after departure from an endemic area. After one year, such otherwise suitable prospective donors may be accepted, regardless of whether or not they have received antimalarial chemoprophylaxis, provided that they have been free of unexplained symptoms suggestive of malaria.

2. FDA guidelines allow prospective donors who have had malaria to donate after a 3-year asymptomatic period outside an endemic area.

3. Immigrants, refugees, citizens, or residents of endemic countries must not be accepted as donors of whole blood or blood components prior to 3 years after departure from the area. After the 3-year period, otherwise suitable prospective donors may be accepted if they have remained free of unexplained symptoms suggestive of malaria.

In general, these guidelines have been effective in preventing transfusion-induced malaria, as evidenced by the extremely low transmission rate. A retrospective study of transfusion-induced malaria in the United States from 1972-1981 found that donor questioning should have prevented half of the cases in which the donor was identified.[4] Because infections with *P. malariae* may be both asymptomatic and long term, infections by that species, which currently account for approximately 30% of transfusion malaria cases, may not be identified by self-reporting.

Currently, blood donated in the United States is not routinely screened for malaria. Some have suggested that blood donated in countries where malaria is endemic should be screened using PCR technology.[5] The current low risk in the United States makes the potential value of such a new strategy minimal.

Finally, there may be explicit or implied incentives to blood donation in certain military settings (e.g., basic training). If such incentives are strong enough, they may discourage the accurate disclosure of information that would appropriately prohibit donation. It remains critical, therefore, that donor questioning be universally and conscientiously conducted and that incentives for withholding information that would lead to donor exclusion be carefully sought and removed.

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